The Tool Engineer

Official Publication of the
AMERICAN SOCIETY OF TOOL ENGINEERS

WHEN *Precision Boring Facing, Turning* OR *Grooving* . . .

there is a

HEALD *Bore-Matic*

that will exactly meet all your requirements

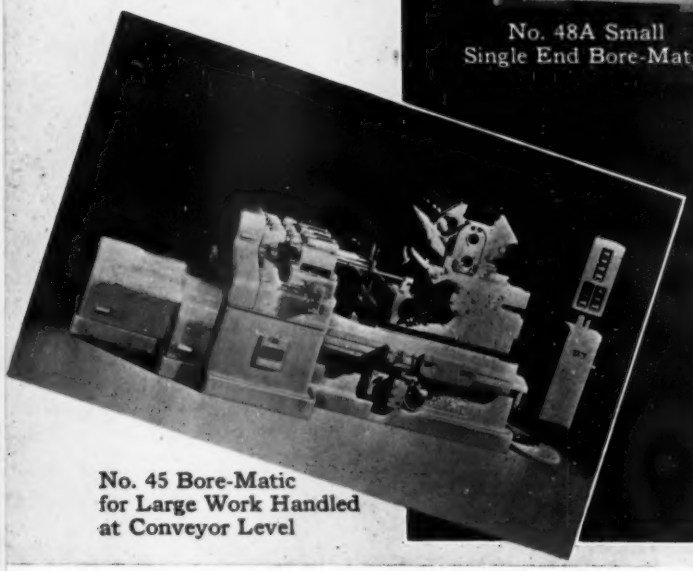
No. 49 Small
Double End Bore-Matic

No. 47A Large
Single End Bore-Matic

No. 46A Large
Double End Bore-Matic

No. 48A Small
Single End Bore-Matic

No. 49 Single End
Universal Bore-Matic



No. 45 Bore-Matic
for Large Work Handled
at Conveyor Level

No. 44 Bore-Matic
for Facing and Grooving

Bore-Matic Tool
Resharpening Machine

WITH several new Bore-Matics now added to the Heald line, any non-ferrous, cast iron, or soft steel parts can be precision finished. There are a surprising number of parts now being borized that previously were finished by other methods.

Send for our bulletins showing installations of Heald Bore-Matics. Better still, ask to have a Heald engineer, who is thoroughly familiar with borizing (the new way of precision finishing), check your work and methods. No obligation.

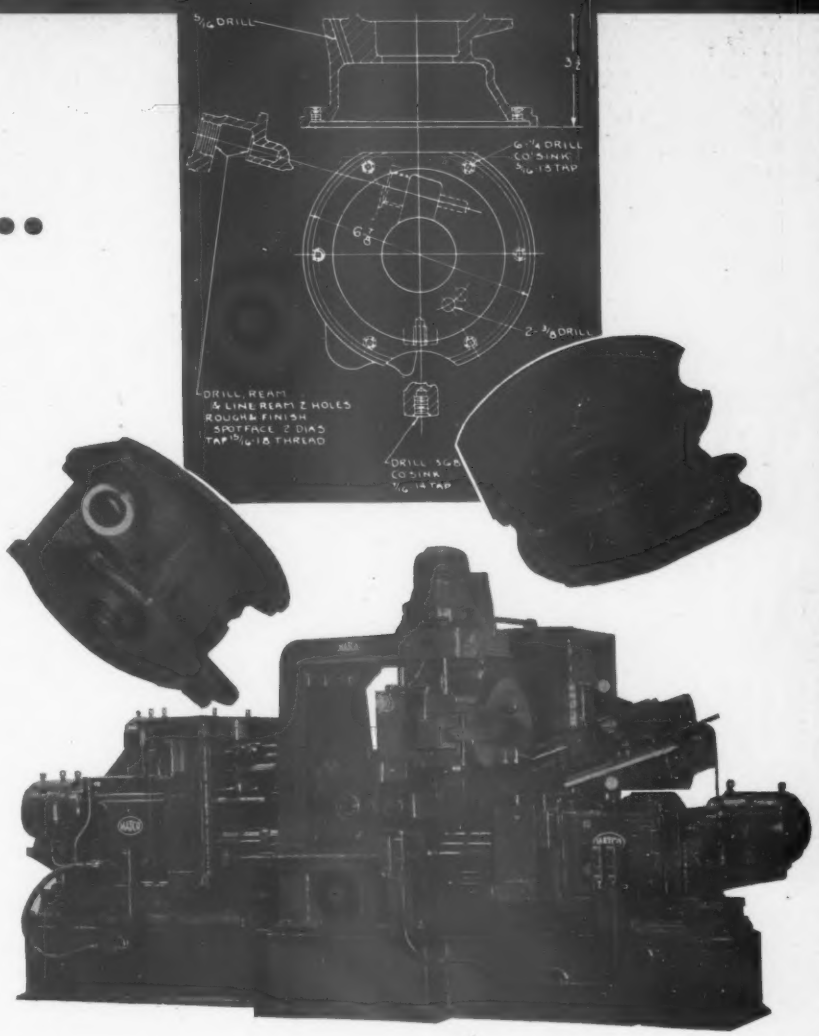
THE HEALD MACHINE COMPANY, WORCESTER, MASSACHUSETTS, U. S. A.

60 Per Hour...

● The NATCO Six-way combination driller and tapper illustrated at the right is performing a total of 37 drilling, reaming, spot-facing, chamfering, and tapping operations on the cast iron rear bearing retainer also shown. The production rate is 60 pieces per hour net.

● Past shop practices would have called for several machines to perform these operations. However, NATCO engineers proposed just such a machine as you see . . . Way equipment built of NATCO HOLEUNITS. This manufacturer took advantage of the possibilities of NATCO equipment and combined these operations . . . greatly reducing his costs on this casting.

● This is an example of NATCO engineering . . . another bona fide example of a particular job being produced with less cost . . . using modern NATCO equipment.



Reduce Drilling, Boring and Tapping Costs with NATCO Production Equipment

● Your success is our success. Unless we can prove to you that you can save money by using NATCO equipment we don't deserve your business. Now it's the business of NATCO engineers to study your drilling, boring, and tapping problems. Without any sort of obligation on your part we will make a careful survey and lay our recommendations before you . . . then you be the judge. Send in your prints or call a NATCO representative today.

* * *

● Chicago Office, 2009 Engineering Bldg., 205 West Wacker Drive. Detroit Office, 409 New Center Bldg. Factory and Home Office, **The National Automatic Tool Co., Richmond, Ind., U.S.A.**

NATCO
SOLVES YOUR HOLE PROBLEM

NATCO Drilling, Boring, and Tapping Equipment

NOT SEEING THE FOREST FOR THE TREES

. . . . . is a mistake like trying to cut die set costs without using DANLY DIE SETS

DANLY DIE SETS SAVE YOU MONEY IN THREE WAYS

❶ DANLY CATALOGING

● From Danly's unlimited number of possible combinations of die set size, thickness and material of shoe and punch holder, bushings and length of pin—you select the die set ideally suited to the job in hand—*faster*—because the new Danly Catalog is easier to use and more complete than any other listing of its type.

Write the Danly Branch Plant nearest you for your copy of this great new catalog and full details on its most profitable use.

❷ DANLY QUALITY

● Danly Die Sets are more accurate—give more accurate parts—and give greater production per die before regrinding.

A typical example of Danly's long-lived accuracy is furnished by this progressive die blanking and piercing holes in oil well chain sidebars. Accuracy of pitch is a prime requirement in sprocket chain. Danly Die Sets produce that accuracy unfailingly.

❸ DANLY DISTRIBUTION

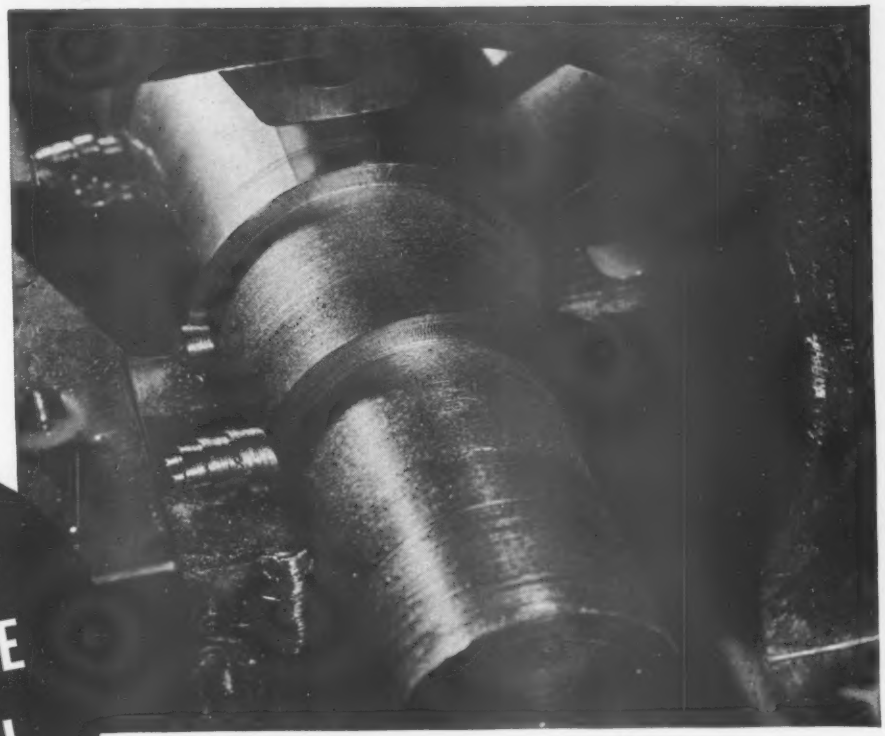
● *Faster* delivery of *better* die sets at lower final costs is offered the manufacturers in each of these 7 districts by the unique Danly Distribution Plan. Danly maintains a complete stock—and an assembly plant—at each of these strategically located points. Each one is equipped to meet any die set requirement—TO SHIP WITHIN 24 HOURS—an unlimited number of possible combinations of Danly Standard Die Sets.

DANLY MACHINE SPECIALTIES, Inc., 2114 South 52nd Ave., Chicago, Illinois

Long Island City, N. Y., 36-12 34th Street
Dayton, Ohio, 114-116 N. St. Clair Street
Detroit, Mich., 1549 Temple Avenue
Rochester, N. Y., 16 Commercial St.
Cleveland, Ohio, 1444 E. 49th Street
Philadelphia, Pa., 3913 N. Broad St.

DANLY DIE MAKERS' SUPPLIES

Speed-up STEEL JOBS



HAYNES STELLITE J-METAL

cuts steel faster

• These three Haynes Stellite J-Metal tools are turning an SAE 1045 steel pinion shaft from 2¾ inch bar stock. The shaft is machined at 125 feet per minute surface speed, 177 r.p.m., with a feed of .017 inches per revolution—or better than 3 inches a minute!

Such high cutting speeds are possible only when cutting tools retain their original hardness at the high temperatures developed in metal cutting operations. Haynes Stellite J-Metal tools retain their hardness, even at red heat.

Haynes Stellite Engineers are prepared to show you how J-Metal will increase *your* production and lower *your* tool costs. Their assistance is part of Haynes Stellite Engineering Service and is available without obligation. Write to the nearest District Office.

PRODUCT OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

J-METAL HAYNES STELLITE TRADE MARK

A red-hard, wear-resisting alloy of Cobalt, Chromium and Tungsten

HAYNES STELLITE COMPANY

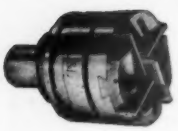
Unit of Union Carbide and Carbon Corporation

UCC

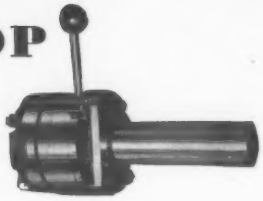
Chicago - Cleveland - Detroit - Houston - Los Angeles - New York - San Francisco - Tulsa

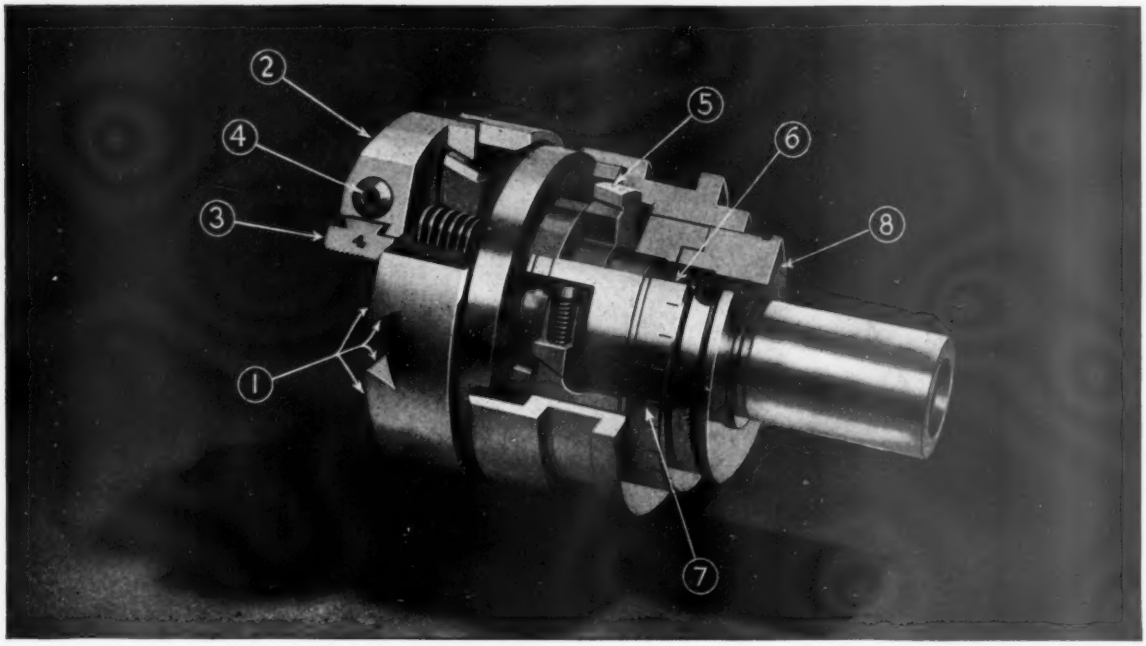
General Office and Works—Kokomo, Indiana
Foreign Sales Department—New York City

Haynes Stellite Welding Rods and information on other Haynes Stellite Products also are available through the 42 apparatus shipping points of The Linde Air Products Company



THREAD TROUBLES STOP
WHEN
J&L DIES BEGIN

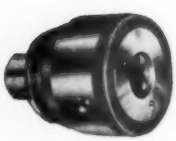




J&L Dies are the choice of those seeking low cost threads *and* an end to threading troubles. A wide range of Die sizes is available, including the Revolving and Stationary, Tangent and Radial types.

We illustrate a cutaway view of the Revolving Tangent model. A few of its salient features are: 1. It is hardened and ground throughout, while the Die body is lapped on the face and in the dovetail slots. 2. The J&L Universal Chaser Holders furnish the utmost rigidity to the chasers. Only one set of these holders is required for any right hand thread regardless of diameter or pitch. 3. Chasers extend beyond the face of the holders, permitting close-to-shoulder threading throughout the life of the chasers. 4. A single screw secures or releases the chaser. 5. The locking ring provides four locking surfaces for longer Die life. 6. The adjusting thread is ground. 7. Widespread calibrations permit accurate size adjustment. 8. By backing off this adjusting nut two or three turns Chaser Holders may be removed.

"PIONEERS IN GROUND THREAD CHASERS"



JONES & LAMSON MACHINE CO.
SPRINGFIELD, VERMONT, U. S. A.

To be sure

from

START to FINISH

FOLLOW THE LEAD OF THE LEADERS

Swing to **BLACK PANTHER**

TWIST DRILLS

Each step in the manufacture of Black Panther Drills has been expertly worked out to the conclusion that corrective measures after hardening are *not necessary.*

From raw material to finished product each individual Black Panther drill is turned, milled, hardened and ground precisely. The equipment utilized is designed and built by Cogsdill assuring absolute uniformity and accuracy.

We solicit the opportunity of testing Black Panther Drills for you.

The Start

THE NEW "SPLINE-LOCK"

PATENT APPLIED FOR

ADJUSTABLE INSERTED BLADE REAMER

By a process of elimination the SIMPLICITY of the Spline Lock Reamer was brought about. The unnecessary parts which hinder easy, quick adjustments have been eliminated.

The "Spline Lock" Adjustable Reamer is expanded *at the machine* in from twenty to thirty seconds—not minutes, but seconds.

The toughest of jobs in the big Automotive Plants have failed to disprove any of our claims for this reamer.

If dependability, accuracy, long life and operating economy are the features you have been looking for in an Adjustable Reamer, investigate the "Spline Lock" Reamer.

GET YOUR COPY OF OUR CATALOG "TOOLS OF DISTINCTION"

Reamers and drills of special design to meet your requirements.
Descriptive literature and engineering service upon request.

The Finish

COGSDILL MANUFACTURING CO.

SERVING THE LEADERS OF INDUSTRY SINCE 1913

DETROIT, MICHIGAN

THERE IS A DIFFERENCE *You See It* IN THE QUALITY OF YOUR WORK

Cleaner, smoother cuts, whether the job is drilling, threading, reaming or milling! *Important*, in these days of closer tolerances and greater precision in all metal manufacture.

To be sure their work will show these cleaner, smoother cuts, quality-minded, cost-minded production executives and shop men rely on the extra values in Morse Tools. They have proved to themselves "there is a difference."

This difference results from extra value—Morse control of heat treatment—rigid step-by-step inspection—exceptionally accurate grinding. Morse's many years of tool making experience play their part.

If there is any doubt as to a difference in leading brands of metal-removing tools, prove to yourself "there is a difference" by trying a Morse tool on your next job.

A conveniently located Morse Distributor will give you prompt service

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TWIST DRILL & MACHINE COMPANY
NEW BEDFORD . . . MASS., U. S. A.

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THE MORSE LINE INCLUDES HIGH SPEED AND CARBON DRILLS - REAMERS - CUTTERS - TAPS and DIES - SCREW PLATES - ARBORS - CHUCKS - COUNTERBORES - MANDRELS - TAPER PINS - SOCKETS - SLEEVES

The Tool Engineer

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Official Publication of the AMERICAN SOCIETY OF TOOL ENGINEERS

Vol. V. JUNE, 1936 No. 2

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Owing to the nature of the American Society of Tool Engineers organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

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Readers of *The Tool Engineer* are urged to return the blank below properly filled out so that each issue will reach them promptly.

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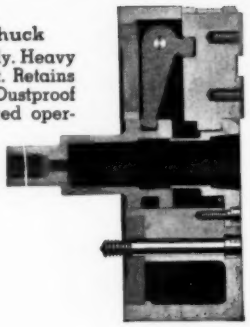
Return to *The Tool Engineer*, 2842 W. Grand Blvd., Detroit, Michigan.

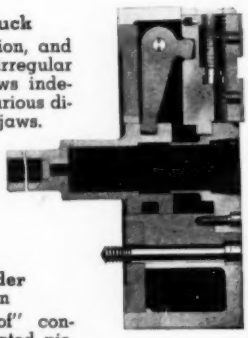
★ QUICK ACTION and
★ GREAT HOLDING POWER
combined in

HANNIFIN
AIR OPERATED
CHUCKS

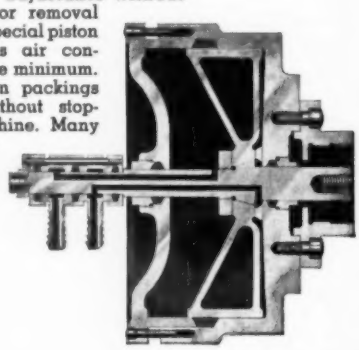
Model B
Heavy Duty 3-Jaw Chuck
One-piece electric steel body. Heavy duty single groove jaw slot. Retains accurate fit indefinitely. Dustproof draw sleeve, oversize forged operating levers.



Model D
Adjustable Type Chuck
For work of small production, and for gripping eccentric and irregular shaped pieces. Master jaws independently adjustable for various diameters, and truing of the jaws.



Double-Acting
Rotating Air Cylinder
for Chuck Operation
Has improved "Leak-proof" construction with graphite-treated piston packing, adjustable without special tools or removal of any parts. Special piston shape reduces air consumption to the minimum. Air connection packings adjustable without stopping the machine. Many sizes. Power range 390 lbs. to 20,000 lbs.



FASTER production is not only made easier, but also more uniformly accurate with Hannifin air operated chucking equipment. The firm "bite" of the air operated chuck is a feature that can be obtained only with air power.

Hannifin air operated chucks and rotating air cylinders for chuck operation are the products of more than 26 years of specialized experience. Simple, perfected design and heavy duty construction result in rapid smooth-acting chuck operation with minimum air consumption, and long, trouble-free life. Write for Bulletin 37 describing the complete range of types and sizes. Hannifin engineers will recommend standard or special equipment to suit any chucking operation.

HANNIFIN
MANUFACTURING COMPANY
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ENGINEERS • DESIGNERS • MANUFACTURERS
Pneumatic and Hydraulic Production Tool Equipment

Detroit Office: Hayward Building, 4829 Woodward Avenue
Telephone Columbia 4949 R. A. Bean, Manager

June Chapter Meetings

CLEVELAND CHAPTER

JUNE 11, 1936

DINNER: 6:30 P. M.

$1.25 per plate.

TECHNICAL SESSION 8:00 P. M.

at

ALLERTON HOTEL, MAIN DINING ROOM

Speaker: MR. R. S. DRUMMOND, President, The National Broach & Machine Company Detroit, Mich.

Subject: GEARS

The speaker will endeavor in this lecture to set forth a number of present methods used in the accurate manufacturing of gears, drawing attention to numerous developments in the last few years in the manufacturing of good accurate, long wearing, noiseless gears.

This lecture will be illustrated by stereopticon slides, with a display of gears, chips from cutters and similar equipment which will prove to be of great interest in gear manufacture and design.

Make reservations immediately with Mr. G. J. Hawkey, Secy. Cleveland Duplex Machine Company, Penton Building, Telephone Main 0112.

All Production Executives, Superintendents, Foremen and guests of Tool Engineers are cordially invited.

DETROIT CHAPTER

JUNE 11, 1936

TECHNICAL SESSION 8:00 P. M.

HOTEL FORT SHELBY

Speaker: MR. H. H. REINECKE, Federal Bureau of Investigation

Mr. Reinecke is Special Agent in charge of the Detroit Office of the Federal Bureau of Investigation which is a section of the United States Department of Justice. He has been with the Federal Bureau of Investigation for eleven years, having engaged in investigative work in almost every State in the Union. He is a graduate of the University of Iowa, with a degree of LL.B. in 1923. He practiced law for two years at Sioux City, Iowa, and in June, 1925, entered the service of the United States Department of Justice. He is a native of the State of Iowa, having been born, reared and educated in that state. Prior to coming to take charge of the Detroit Office for the Federal Bureau of Investigation, he was in charge of offices at Indianapolis, Indiana and Charlotte, North Carolina.

Mr. Reinecke has spoken before nearly every luncheon club in the City of Detroit and has a fascinating story to tell, which should be heard by every citizen. In view of their recent success in cleaning up the kidnapping racket, his talk will be most apropos and he deserves a large attendance.

PRODUCTION PERSPECTIVES

THERE has been no change in the level of production, generally speaking, since last month. If anything **mass manufacturing plants,** everywhere, are **even busier than they were thirty days** ago. **In the Detroit** area **all Tool Engineers are employed**—many of them more hours per day than they relish. New England plants all are busy—many of them working on forty-eight hour weeks, while others are working more than one shift.

Numerous **expansion programs** are **being launched in the Connecticut** manufacturing field. **Russell Mfg. Co.,** Middletown, is preparing to consolidate all operations in the Middletown mills at South Farms and to modernize or replace much of its equipment. A new water-conditioning plant has been installed in the dyeing department of the textile section and **new equipment** has been **added** to the grinding department of the automotive division. Modern hydraulic press equipment has also been installed . . . . **Bridgeport Brass Co.,** Bridgeport, **is planning to spend $450,000** for replacements, improvements and an addition to the Housatonic Avenue plant, details of which are still being worked out.

Cooper Oven Thermometer Co., Pequabuck, has started a two-story factory addition, **Colt Patent Firearms** Mfg. Co., Hartford, is still working on rehabilitation necessary as a result of the Connecticut River flood, and the task is not expected to be complete before mid-summer. A new building, 120x200 feet, is being erected by Colt's, and production has been carried on at a good rate in most departments, including the electrical, plastics and dishwashing divisions.

The newly-formed **Derby Die Casting Co.** started operations recently with a small force on Housatonic avenue, Derby, with **Max Hirsch** in charge... **Cowan Machine Co.,** 64 Water street, Stonington, has been sold by Charles H. Cowan, Jr., to **Samuel E. Stewart, Jr.,** and others, and its name and operations will be continued without change, manufacturing silk machinery.

Arthur G. Baldwin, master mechanic at Factory N. International Silver Co., Meriden, **completed 45 years of service** with the company recently, and was honored with a service award. **Albert M. Mayne,** a foreman at Factory H of the same company, was **recently elected president** of the **National Council of Foreman's Clubs** at the national convention in New York. **John W. Bartholomy,** 60, former assistant superintendent of the **McIntyre Machine Co.,** Hartford, and lately connected with the **Royal Typewriter Co.** in the same city, died May 13 after a week's illness. **Henry E. Chase,** master mechanic for the **H. L. Judd Co.,** Wallingford, for more than 35 years, died in April. **Pitney-Bowes Postage Meter Co.,** Stamford, is preparing for a large expansion of its plant, including erection of one or more two-story buildings. Two brick additions are planned by the **Lux Clock Co.,** Waterbury, one to be three stories and basement, 140 x 43 feet, and the other one story, 40 x 160 feet . . . Activities of the **Stromberg Electric Co.,** Chicago, recently acquired by **General Time Instruments Corp.,** are being transferred to the plant of the **Seth Thomas Clock Co.,** Thomaston, a General Time unit.

Alvin Hinton, lately in charge of time study at the **United States Aluminum Co.,** plant in Fairfield, has been promoted to the post of shop superintendent, filling a vacancy caused by the death of **Purcell O. Sizer. C. H. De Lamater** succeeds Hinton in the time study department . . . . William H. Stedman, 72, retired superintendent of the **Merrow Machine Co.,** Hartford, and widely known as an inventor, holding numerous patents on machine tools, died in April at his Mansfield Depot home. He had been superintendent since 1890. Manufacturing and engineering supervision of plastics production in five plants of the **General Electric Co.** has been taken over by **G. H. Shill** of the Bridgeport factory and Ray E. Coleman, manager of the plastics divisions in Meriden, Conn., Pittsfield and Lynn, Mass., and Fort Wayne, Ind., has been transferred to Bridgeport . . . . Directors of the **Smith & Griggs Mfg. Co.** Waterbury, have approved transferring control of the company's operations to the **Risdon Mfg. Co.,** Naugatuck, and negotiations for consolidation are going forward. Smith & Griggs makes all types of buckles, clasps and other hardware articles, while the Risdon company manufactures automobile specialties, safety pins and motion picture cameras. **Henry C. Cashen,** formerly master mechanic for the **Bradley & Hubbard Mfg. Co.,** Meriden, and connected with the company 52 years when he retired in 1934, died May 19. **The Bullard Co.,** Bridgeport, builder of vertical turret lathes and other machine tools **announced its first common stock dividend payment in six years** on May 21, to be paid June 30 at the rate of 25 cents per share.

James L. O'Neil, previously associated with the **United States Rubber Co.,** has resigned to **become factory manager** of the **Lincoln Machine Co.,** Pawtucket, R. I., tool and machinery manufacturers. **H. F. Wright,** for several years identified with the small tool industry, has been **appointed assistant** domestic **sales manager** at the **Nicholson File Co.,** Providence. He was formerly a partner and manager of the Wright Manufacturing Co.

Metal working industries of the **Springfield,** Massachusetts **district** are particularly notable for the uniformly **good showing made in production and orders.** The fact that orders have practically kept pace with deliveries in many instances is viewed as **a good augury for June and July operations. Machine tool demand is holding up remarkably well,** with the automotive field accounting chiefly for this class of business. Where equipment was being bought more largely by automobile manufacturers in an earlier stage, the demand has been coming more from parts manufacturers in recent months. There is a well-sustained demand for machine tools from the tool-making departments of many establishments. **Taps and dies, gauges and other small tools are being bought extensively.**

Ignition and motor car **radio sets** are **being produced in good volume.** The output of refrigerators is at a sustained high level. *(Continued on page 31.)*

Modern Drop Forging In Relation To Machine Shop Practice

By R. E. W. HARRISON
Vice President
Chambersburg Engineering Company

As given before Detroit Chapter meeting of A. S. T. E., May 14th.

Chairman, Gentlemen: It is a pleasure and an honor to talk to you tonight. I feel that I am tolerably well acquainted because in times gone past I have talked to the Detroit engineers before. The fact that I am here again is proof of your hospitality and patience.

"I am particularly interested in your Society, because I have seen the need for it through the years. Many years ago when I was practicing in England the same situation arose and to get action we had to form a separate Society there. This was known as the Institution of Production Engineers. Their mission, however, was precisely the same as yours; that is, to get down to what might be termed the absolute brass tacks of production. I hope that my small contribution tonight will help in that direction. I have endeavored to keep away from purely theoretical considerations and to make my talk as practical as possible. I have spent a good many years in studying and working on what might be termed the final operations in mechanical fabrication, precision grinding, lapping. We remove the last few tenths or few thousandths from out the dimensions of the job and bring it within the acceptable tolerancy. Despite the fact that in certain quarters cheapness in final costs apparently is not enjoying the favor which it might, however, I feel that Detroit is the last place in the world where one would attempt to prove the folly of high prices for quality in such a thing as automobiles. Because in no place has it been demonstrated quite so adequately that real quality can be delivered at the low price if the method and tool equipment are right.

However, when I left the Department of Commerce, in looking around for a place where I might put a little experience to work, I came to the conclusion that not only in the finishing operations but in the primary or basic operations there was an opportunity to save money, and although we must necessarily remove metal in an efficient way, the smart thing to do is not to put any more metal on than is absolutely necessary. You all recall the type of advertisement that we saw in the technical papers a few years ago. You would see a picture of a crank shaft with a phantom picture in the middle of it of the finished job. The outline would be the rough forging, and the caption would run something like this, 'Weighed in the rough—1000 lbs. Finished weight—500 lbs. Surplus metal removed in so many hours on so and so's lathe.' Gentlemen, that was wonderful advertisement for the lathe, but in my estimation it was a ticket for the lunatic asylum for the engineer who sponsored that type of practice.

"Now the same thing applies to the foundry, but tonight we are concerned with the Forge Shop. In this little paper I am hoping to present to you certain aspects of the matter which make it possible to achieve that reduction in metal to what might be termed the economical limit. There is a limit beyond which it doesn't pay to go. But it is futile to buy highly efficient machine tools to remove metal which should not be there in the first place.

"What do we find when we get in the average forge shop? A place where you freeze to death in winter and you are roasted alive in summer. Usually not very clean. You don't usually find conveyors, in fact you find very few of the conveniences of manufacture or transportation and manipulation that those of us who are acquainted with automobile shop practice have come to regard as vitally necessary. In the average shop we regard the conveyor as just as much a part of the equipment as the machine, as the actual metal removing machine. But you could count on the fingers, on half the fingers, of one hand the shops in the United States with conveyor equipment in the forge shop.

"I think a speaker is permitted to refer at least once to the subject of the talk so I will endeavor to define, 'What is good drop forging practice?' One, the production of forgings which are true to die and with a minimum of flash. Forgings with top and bottom halves matched in near perfect alignment. The production of forgings with grain flow so disposed that physical characteristics are the maximum obtainable with the metal used. Forgings without cold shots, laps or seams, produced in the minimum of time.

"To produce forgings to the foregoing specifications, we need a drop hammer of adequate size and capacity. The tendency, gentlemen, is to use heavier tools all the time. That is the hammer. The 2000 lb. hammer that was considered satisfactory a year ago is now being replaced in large numbers by the 3000 lb. hammer. We need a tool which will retain through the years of usage its ability to keep the dies properly matched. The use of a hammer which will accomplish a given amount of work with a minimum number of blows in the minimum time. A hammer which is invariably under the operator's control. This control being exercised with the least possible physical and mental effort. Reliability, or in other words, continuity of service and above all safety for the operator. There is a lot of power in 12,000 lb. reciprocating in front of your nose at a high speed. The problem which we are confronted with then, is one of technique. And in this connection it is well to know that just as a $20,000.00 Precision Grinding Machine is only as efficient as the $50.00 grinding wheel with which it is equipped, just as the $5,000.00 Planer can only produce within the limitation of the cutting tools which cost, perhaps, $40.00 apiece, or the $10,000.00 Lathe can only measure up in accordance with the $40.00 cutting tool, the drop hammer can only give maximum expression to its productiveness if it is equipped and designed and made right, and then equipped with a tool set-up in the form of dies which represent the

(Continued on page 18.)

EDITORIAL

EMPLOYMENT and INCOME

by Andrew E. Rylander

A year or so ago, and previously during the depression, *The Tool Engineer* prophesied that with return of prosperity would come an unprecedented demand for trained men, also, that wage levels would soar to new heights. That prophesy, which may have seemed all too optimistic at the time, now assumes tangible aspects. Trained men **are** in demand and wage levels are mounting, also, there is a healthy trend in Industry to stabilize employment. However, this seems to apply to the shop rather than to the engineering office. Intermittent employment and comparatively low compensation still constitute an evil incidental to Tool Engineering in general and to tool and die design in particular.

Considering the first as of major importance, it would seem that all engineering groups should consider means of stabilizing employment in the engineering field, thus promoting the profession and making the engineer a more stable factor in our economic scheme. Just how much stabilization is to be effected may be subject to debate. We advance no pet idea; rather, present the problem for consideration. A logical method, however, would be to transfer engineers to the shop during lulls in engineering programs, since during such lulls the shop is usually busy. This is a practice with many eastern concerns, which may be a reason why the East produces so many trained men. *Diversified experience*, in brief.

An alternative would be to concentrate on improved methods during dull periods. It is no stretch of the truth to say that at the height of a program the engineers are too busy spreading lead to find time to think, and when the rush is over all but key men are summarily laid off, being then considered an unnecessary expense by Management. Yet, the dull period offers excellent opportunity to prepare for bigger and better things. As it is, Management takes the attitude of the Georgia cracker whose roof leaked. When it rained he *couldn't* fix it, and in fair weather he just *wouldn't*. Fortunately, however, progressive Industrial leaders incline to take advantage of the dull period; when the rush comes, they have a decided advantage over their less far sighted competitors.

As for compensation, it is no secret that engineers are far underpaid, considering their superior training and that their training has often entailed real sacrifice. Besides, the future progress of Industry rests squarely on the shoulders of the engineer. He should be compensated in proportion to the load he carries. In this contention the writer is also supported by Industrial leaders; and the technical press has for years advocated high wages as a sound economic practice.

It would, of course, be utterly foolish to consider stabilized employment and higher compensation merely as a concession to a favored group. Rather, the idea should be considered on its merits, as plain economic horse sense. The man steadily employed can contract purchases impossible to the worker intermittently employed (unless he be irresponsible and buys without thought of final payment) and, the higher his stipend, the greater his value as a buyer. Reduced to essentials, it means that the engineer, trained to high standards, will maintain standards comparative to his income. Stabilized employment, then, would foster a market in a large field, while higher compensation would promote sales of homes, automobiles, radios, household appliances and the various products of Industry.

Conceding that this is but a brief outline, reason nevertheless shows it is common sense. The question is, how to effect the result. The problem must be attacked from within the confines of engineering ethics, without forgetting that without at least stabilized employment, even engineering ethics must eventually suffer. The subject is provocative of discussion and merits the consideration of Management and Industry as a whole. What solution have **you** for a perplexing problem?

To get peace, make for yourselves pleasant thoughts.—Ruskin.

Novel Gage Checks Part to Accuracy of 30 Millionths

In checking the squareness of an internal diameter to a face, the usual method of using a tapered arbor on centers is never accurate if the diameter of the hole is considerably larger than its length.

To overcome this condition, the gage illustrated was designed to check the exact squareness of the hole and face of a refrigerator part.

The construction of this gage is very simple, consisting of a ring in which are 3 buttons, against which the face of the part rests, a central plug which acts as a carrier for a pivoted lever, against which the internal diameter rests at a point on each end of the bore.

(Continued on page 26.)

Who Will Go The Farthest In Tool Engineering---The College Graduate Or The Practically Trained Man ?

• • •

Editor's note—As an experiment, two men prominent in Tool Engineering were each asked to state their respective views on the question discussed. Since the discussion is, in a sense, a blind debate, their versions may prove especially interesting. The more so since both are college trained men and both protested the assignment on similar grounds—that both theory and practice are essential to Tool Engineering.

For the college graduate

Author anonymous

To say which is more important, technical training or practical experience is like saying whether a bird's wing is more important than its head. No one probably ever had to make an answer to the question posed here, so in a sense we are discussing a theory beyond the realm of human experience. No man can be entirely technically trained and be a Tool Engineer. Neither can anyone, without studying from books, ever be a Tool Engineer. The job demands an intimate knowledge of the design, construction and operation of all items of machine shop equipment.

If I were a young man so situated that it would be impossible for me to get both the practical and technical sides of Tool Engineering training I would follow some other line of endeavor, I can't imagine what physical derangement could bar one from learning the manual side of factory operation and at the same time not bar him from meeting the physical requirements of the job of Tool Engineering.

In the early days of the development of any line of work there is a time when it passes through the phase of transition from a trade to a profession. At this time the value of technical, scientific, theoretical or "book larnin" as a means of gaining proficiency in the line is questioned by all the "old timers." It only takes a glance at the history of any of the present day professions to see that the "Rule of Thumbers" were all wet and also that the new boys in the field who thought they knew it all after having read a few books on the subject were just as "haywire."

Every successful engineering organization is made up partly of men who are entirely practically trained,—that is, they are not college trained. In the successful organization there are also men who have excellent theoretical engineering training. The co-operation of these two classes of individuals and an appreciation of each other's limitations and abilities and the elimination of petty jealousies makes the group function better than an efficient individual. It's doubtful whether an individual possessing both years of practical shop experience and excellent technical training could ever be as trustworthy as a conference composed of individuals wholly practically trained and other individuals wholly technically trained. Neither the entirely technical nor wholly practical man can be depended upon for reasonable judgment.

A successful Tool Engineering organization must contain its old timers who have been through the mill and know the ins and out of all shop practices and routines. They are needed to perform the function of a governor on a steam engine.

The results of all scientific research, especially at the present time in the fields of electro-chemistry, metallurgy, hydraulics and optics must be adapted and applied to the field of mass production. This can be done only by a technically trained Tool Engineer.

Practice must temper theory. But theory must light the way of all advancement.

For the practical side

Also anonymous

The question is tantamount to asking a fellow how long is a piece of string. This age has produced several prominent engineers who never saw the inside of a college until, their work done, they were awarded honorary degrees. However, even these concede the value of theory, since at least one of these practically trained men has founded an engineering college. Frankly, I don't know who would go the farthest in Tool Engineering, the college graduate or the practically trained man, since it has already been proven that either can go a long way, if he has the stuff.

You can make a draftsman *of a sort* out of almost any human material, but only innate ability makes the designer or engineer. The shop can't make a mechanic; it can only train the man possessed of mechanical ability. Neither can the college make an engineer, although it can call a graduate that. It can—and does—produce good engineers, provided that the student has latent ability to start with. Also—and usually—it turns out good draftsmen. Whether their pretty pictures are worth a hoot or not depends entirely on whether or not the graduate knows what he is drawing.

Reduced to essentials, neither the shop nor the college can effect the impossible; however, the shop has the advantage that it deals in concretes rather than in abstracts. The shop man can cut and try, and sees his creation in motion—has a fourth dimension, so to say—while the draftsman sees only three views, all flat. He has to *imagine* motion, the shopman *sees* it. Also, the latter can iron out the bugs from actual trial, while the draftsman, often as not, never sees the tool he has designed. Hence, he can go blissfully on, piling mistake on mistake, unless checked by an experienced supervisor who, it will be found, has had both technical and shop training. It follows, then, that both theory and practice are essential to the greatest progress in Tool Engineering.

Having thus conceded a point to my opponent, I nevertheless assert that, in a grudging choice between the two, the practically trained man will go the farther in Tool Engineering. Anyone can learn to draw, *after a fashion;* perfection is a matter of application and practice. At the start, the shopman will make the poorer drawings, but if intelligent will learn the little tricks of the drawing room. If inventive and imaginative, he can design, and in the last analysis, it is the result that counts. The result is the *tool.* If it works, is convenient to operate, maintains accuracy with easy replacal of perishable parts and produces its quota with some to spare, then, the design is adequate, even though the drawing may look like—well, what I started to say. On the other hand the creation of the college graduate, sans shop training, might easily turn Rube Goldberg green with envy.

In reviewing the above I find—but no! This little blind debate may easily provoke an interesting discussion, and I am curious to see if our readers can find the real flaw in my argument. If not, I'll lay my cards flat on the table, face up, in a later issue of the Tool Engineer.

GONG!

End of first round. We now call for a vote from our readers, and will award a useful prize to the writer of the best letter on the subject.—Ed.

BUSINESS and the ABUNDANT LIFE

Address by Dr. Glenn Frank, President of the University of Wisconsin, before the 34th Spring Convention of the National Machine Tool Builders' Association at the Edgewater Beach Hotel, Chicago, Illinois. May 11, 1936.

THAT phrase, the "abundant life," was first used by Jesus, and in using it I assume that He was thinking primarily of the spiritual values of existence. In our generation we are inclined to think that spiritual values are helped rather than hindered by a decent scale of living and by a sustaining sense of security. The abundant life, in the sense of a decent scale of living and an adequate sense of economic security has been thought of until recently primarily in connection with the business and industrial processes of the country. There has arisen, particularly in these depression years, a school of thought that proceeds upon the assumption that the capitalistic system, if it can be said to be a system, has broken down and that if the abundant life is to be achieved for the millions it must be achieved not through business forces but by the grace of political forces.

I think there is a similarity of response in all of these national answers. There is in all of these new politically experimental governments of our time a tendency in the field of economics to subject private enterprise to political management.

Throughout the world individualism seems to be on the run as one government after another announces its determination to plan the life and the enterprise of its people. I suppose there is no other issue before the world on which there is as much confusion of judgment. It is an issue that is too often monopolized by the voices of incentive reaction on one hand and of irresponsible Utopianism on the other. I should like, if I could, to bring some measure of clarification to this issue tonight.

Let's be perfectly honest about how all this came to be. A steady enlargement of the role of the state in the nation's enterprise has been under way with us for a long time. It wasn't invented entirely by the Brain Trust, and it didn't begin with the New Deal. Even before the New Deal was born, the Federal Government in this country was taking a pretty large hand in the private enterprise of the people. It was rushing to the rescue of banks, it was administering restoratives to railroads about to swoon into bankruptcy, it was becoming a speculator in grain exchanges, it was propping up tottering manufacturers, it was playing banker to the farmer, and so on.

We have to set it down as inescapable because the peculiar characteristics of this power age have made impossible any wholesale reversion of government to the unqualified policed role of a century and a half ago. In other words, the road back is not the way out. It doesn't follow, however, that the only choice open to us is between an anarchic individualism on the one hand and an all-embracing state on the other. Surely we should think twice before we follow the lead of Russia, Italy and Germany with their very varied versions of the all-dominant state. The easiest, the simplest and the laziest thing for a people to do is to run to the government for salvation at the first hint of difficulty. Of course, that may work very well for a time if the luck of events shoves a strong man to the center of the political stage, but in the long run I am convinced that there is nothing but disaster ahead if we make any political leadership, no matter how strong or how sincere, economic receiver for American enterprise.

I think it is imperative that government shall take a definite hand in the broad guidance of economic policy but it will, in my judgment, subside if we permit government to go beyond its share in the broad guidance of economic policy to any attempted dictation of the detailed procedures of this nation's enterprise.

I believe profoundly that government in this complicated age should set up the social ends; that economic enterprise must establish the prods and the penalties that will, when necessary, compel economic enterprise to serve these ends. But I have exactly no faith in the capacity of political government to give us either stability or progress when it sets out itself to run the show, whether it be the agricultural or the industrial show it sets out to run.

Editorial Note:

There is an economical side with which the average engineer is not familiar, however well acquainted he may be with the laws of mechanics, design, or the use of production equipment. These are often difficult of application without a proper cognizance of the fundamental laws of economics and their relation to the human element. This address by Dr. Frank, abridged somewhat to permit publication here, is rather remarkable in its treatment of the human economic phase of production. We recommend it at this time, when mass production is under fire, as of particular interest to the Tool Engineer.

I confess that I grow a bit tired of reading the daily obituaries announcing the death of capitalism because I have the notion that it is not authentic capitalism that is dying. It is a perverted something that carries the name of capitalism which is today most under fire.

This seems to me at least the beginning of a picture of a true capitalism. Conservative as well as liberal politicians have very often joined hands with the more shortsighted leaders of American capitalism to do to American capitalism things that have seriously crippled it and left it open to its more radical critics.

Nobody knows what part mass judgment will play in the answer to that question. If the toiling millions on this continent become convinced that greater happiness can be found for them by declaring a moratorium on scientific progress, throwing the brakes on technological advance, and deliberately reducing the enterprise of the nation to smaller and more easily manageable dimensions, well and good, if that is what the millions want. But that isn't what the millions want. They hunger to have full human advantages of the utmost that this age of science, technology and power production is so clearly equipped to bring them in comfort, convenience and liberation of spirit.

In an age of scarcity, the poor will endure their lot without undue whimpering. But I do not believe that want will forever stay docile in the presence of plenty if that plenty is kept just beyond its reach by blind blundering in the field of political and economic policies. To me the most disturbing fact of the time is the number of Americans, who have fallen victim apparently assuming that science and technology have been too efficient in producing or being able to produce a limitless output at low prices, and that therefore the thing to do is to plan a lesser output at higher prices.

To restrict production and to raise prices is not liberalism; it is reaction of the rankest sort. It is not statesmanship, but surrender. It is not creative advance, but, contrarily, retreat. That way lies a permanent and perilous lowering of living standards for the millions.

I do not believe it was for this that the pioneers builded their blood and sacrifice into the foundations of this republic. More goods at lower prices, not fewer goods at higher prices, is the only defensible goal of an age of science, technology and power production.

To me it is incredible that in an age of so much tragic, crying, unfilled human needs we should think it necessary now to set out on the Quixotic attempt to increase welfare by destroying wealth or declining to create it. Our ancestors fought valiantly over the centuries to conquer famine. Are we now to say that they made too good a job of it, that their conquest of famine was too efficient? After the sweat of generations have brought us out of an economy of scarcity into at least the possibility of an economy of plenty, are we to confess that we are incapable of managing plenty and that the best we can do is deliberately to legislate a modified famine on the installment plan in just those sections of our enterprise where production has proved most efficient?

Science and the machine have brought us to the threshold of a social millenium but up to date we have lacked the wit to unlock the door.

All of the necessary tools are in our hands for emancipating the people from poverty, drudgery and insecurity, and if we now fail to effect this emancipation we shall go down in history as traitors to the tools of our own invention.

I think we must be very careful in the years ahead lest in our efforts to stabilize we succeed rather in sterilizing American enterprise.

PATENTS

SCOPE OF PATENT PROTECTION

Fourth in a series presenting a concise, informative guide on the subject of patents.

By EVERETT G. WRIGHT
Patent Attorney
Detroit, Michigan
Member of the Michigan and Federal Patent Bars

Basic *versus* Improvement Patents. Patents granted for the first invention or discovery of an art, machine, manufacture or composition of matter are called basic or primary patents. As an art is developed certain improvements thereto are constantly being invented and patented, these patents are called improvement or secondary patents.

The holder of an improvement or secondary patent is not entitled to make, use or vend that which is protected by a basic or primary patent without a license from the holder of the basic patent unless or until the term of the basic patent has expired. Also, the holder of a basic or primary patent is not entitled to make, use or vend the improvements covered by the improvement or secondary patent without a license from the holder of the improvement patent.

Whenever the basic and improvement patents are held by one party, the relative rights to make, use and vend the primary and secondary inventions become merged and are of no importance.

After the expiration of the term of the basic or primary patent, there may exist similar relative rights between an improvement patent and a patent for an improvement to an improvement as exist between primary and secondary patents. There may, of course, be any number of independent improvement patents having secondary relation to a basic patent but with no relation to each other.

Claims—the Measure of Patent Protection. Each patent must contain one or more claims which define the scope or quantum of the patent protection granted to the inventor. The necessity for claims in a patent is statutory, the inventor being required to "particularly point out and distinctly claim the part, improvement or combination which he claims as his invention."

Generic Claims. A generic claim defines an invention in such broad terms as to permit its scope to include a class of invention not found in the prior art. Generic claims are commonly referred to as broad claims.

Specific Claims. A specific claim defines an invention in such narrow terms as to include only a limited embodiment of invention not found in the prior art. Specific claims are commonly referred to as narrow or limited claims.

Both Generic and Specific Claims are Desirable. The usual practice is to protect an invention by a plurality of claims ranging from the broadest generic claim allowable in view of the prior art to a comparatively specific claim directed to a preferred embodiment of the invention. Both types of claims are desirable since the generic claims may be held invalid because of being so broad as to be anticipated by the prior art, or the specific claims may be so narrow as to be held valid but not infringed when attempting to enforce the patent.

Form of Claims—Number Permitted. A patent claim must define a complete and workable embodiment of the invention, be drawn in positive terminology consistent with that of the specification, and show a substantial advancement over the prior art.

Patent Office practice permits any reasonable number of claims in a patent providing each claim is patentably distinct from the others. Undue multiplicity of claims should be avoided.

A Patent May Only Include One Invention.—Double Patenting Prohibited. Two or more independent inventions cannot be included in one patent; however, where several distinct inventions are dependent upon each other and mutually produce a single result, they are in effect one invention and may be claimed in one patent.

A patent may contain specific claims to more than one but not more than three species or embodiments of an invention, providing it also contains a generic claim reading upon all the claimed species.

Double patenting is prohibited; that is, an inventor may not obtain more than one valid patent for a single invention. If a second patent for the some invention is inadvertently granted to the same inventor, the last patent, not the first, would be void.

* * *

Prior Art in General. "Prior Art" is a broad expression used to designate the state of advancement of an art, machine, manufacture or composition of matter at a time sufficiently early to anticipate an invention within the meaning of the patent law.

In an early issue of *The Tool Engineer* this series will continue with a discussion of the Prior Art, Validity and Infringement of Patents.

MODERN DROP FORGING

(Continued from page 13.)

ultimate in present day practice.

"Now, I assume that as Tool Engineers you would be particularly interested in the dies. Die block steel as made today is never permitted to go cold from the time the ingot is cast until final tempering treatment. A very important point. We are using dies today which in many cases are 20" thick. The modern die block is furnished in four regular hardness ranges. Formerly the maximum hardness of die blocks that could be machined in the old style tool rooms was approximately 55 Scleroscope. Today we can cut with greater ease the alloy steels between 62 and 63 Scleroscopic hardness.

"What does that all mean? We didn't develop this highly finished die technique just for the sake of doing it. The net result is that the dies as produced today will turn out any where up to 50%, I might say on the average of 50%, more forgings from the impression between recuttings than was formerly the case. It is a matter of dollars and cents. Incidentally, too, the die blocks are not reheat treated between cuttings. It is a little difficult to particularize but I will quote two examples. A very good example of extra endurance is shown in one of the Detroit shops here. These people formerly produced 10,000 connecting rods by the straight drop hammer method in between recuttings. The die steel that is used today produces 30,000 connecting rods. This is accomplished by roughing the rods out in the form of a forging under the hammer and then coining them to the finished sizes. Crank shafts a few years ago were forged four throws in line, whereas today most forge shops are forging eight throws in position. Another example, also drawn from one of the local shops, covers connecting rods also. They average between ten and twelve thousand connecting rods at one cutting and the present-day die block produces on the average between fifteen and eighteen thousand. Every case is a little different and varies with the particular shop, the particular type of hammer that is used.

"We have heard a great deal lately regarding the use of semi-steel castings in place of forgings, and the answer to this particular problem has not yet by any means been finally arrived at. However, it is hoped that with the improved results which are being made available during the last two or three years in consequence of improved technique in forging will permit the balance shoot between castings and forgings to be drawn with greater accuracy than that which hitherto has been available. I will ask you to remember in connection with that statement, gentlemen, that 85% of our forging equipment is over ten years old.

"I have endeavored to cover a number of points in this brief talk that are of current interest in the trade and no doubt there will be others which you will think of and if you care to debate them I will be glad to give you the best answer that I can. If this paper adds or coordinates in any way the information that is available on this subject I will consider the time well spent."

NEW EQUIPMENT

A new high speed friction Tapping Attachment, known as the TRU-GRIP Tap Holder, is announced by the Procunier Safety Chuck Co., 18 So. Clinton St., Chicago. Claimed to be the smallest and lightest of its kind, this new tap holder has an aluminum housing which contains the mechanism. Steel parts are extremely light, with a planetary reversing mechanism and ball bearing installation for maintained accuracy. A double cone, cork faced, provides an easy but powerful friction drive and reverse. Taps are held in spring collets, one for each size of tap, with drive through the square shank. A peep hole is provided to permit the operator to check the grip.

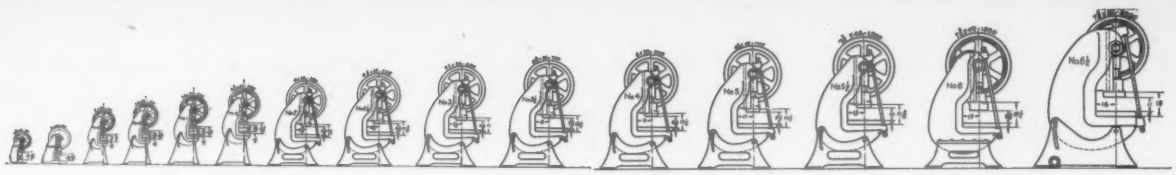
The O.D. of the spindle is only ¾", and is integral with the chuck holder to insure accuracy. This small size permits tapping close to shoulders. Due to the extreme lightness of the unit—a mere 2½ ounces including spring collet and chuck spindle—fly-wheel effect is reduced to a minimum.

Advantages claimed are: Clear vision without stooping or sitting; greater sensitiveness and reduced tap breakage, decreased wear and greater safety, since there are no protruding parts to catch in the clothing. This Tru-Grip tap holder is available in the new "Procunier" High Speed Tapping Attachment which has a capacity of No. 2 tap to 3/16" in steel, and ¼" in brass and cast iron.

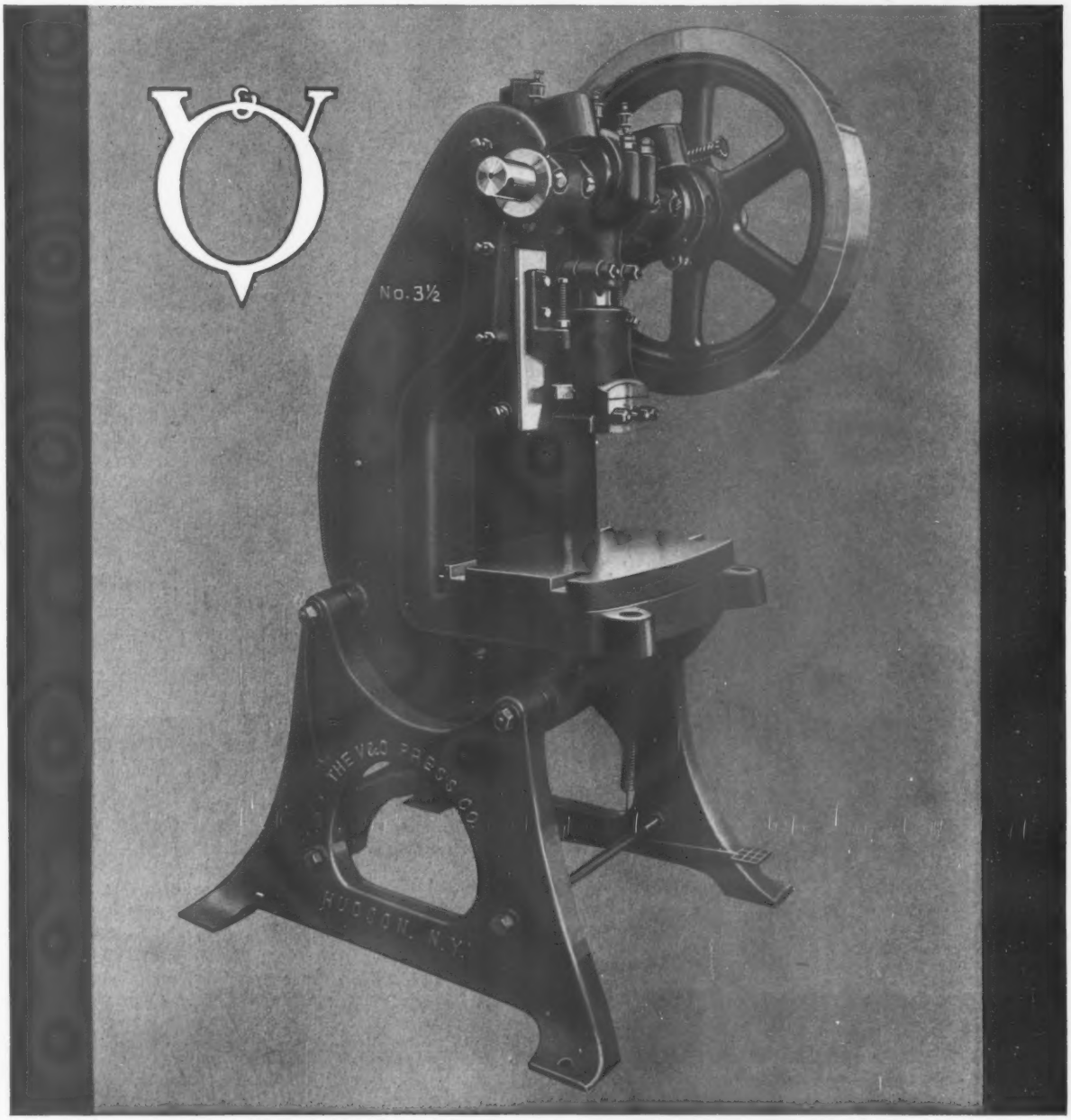
Ex-Cell-O Aircraft & Tool Corporation of Detroit, Michigan, announces a new Universal Precision Thread Grinder with a capacity for grinding external threads 8" in diameter, 24" long, on a maximum length work piece of 33" between centers. The machine is also adapted for grinding internal threads on work having threads not smaller than 1" in diameter, 1" long, up to 8" diameter, 3" long. U. S. Standard form, sharp "V," 29 degree Acme, up to and including 60 degree thread form and modified Buttress threads with single, double, triple, quadruple or sextuple threads within the range of pitches from one to 40 can be ground on this machine. Tapers up to two inches per foot included angle can also be ground. A lead tolerance of .0002" per inch when grinding U. S. Standard form threads can be maintained.

The machine is automatic in all its grinding operations except for loading and unloading the work and withdrawing the grinding wheel at the end of the cut. It will grind to a predetermined size setting and then automatically stop feeding; or it may be set so that the table will stop at either end or at any point of its travel.

All controls for the machine are located on the front of the machine on a control panel. Manual controls are also provided for use independently of the automatic controls.



AN ADAPTABLE LINE



It is difficult to over-emphasize how adaptable V & O Inclinable Presses are to a wide range of operations. The sturdiness of the body, the long slide, the overhanging bearings, the eccentric type shaft, all go to make up rigidity, which in turn is reflected in the lengthened life of the dies. Ask our dealer to tell you more about our machines.

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A. S. T. E. Chapter News

CLEVELAND

The April meeting of Cleveland Chapter, held in the rooms of the Cleveland Engineering Society on the 9th, marked the installation of new officers for the coming year. Mr. R. A. Fintz was installed as Chairman; he, in turn, reappointed the chairmen of the various committees to serve another term. He also appointed Mr. Goddard to serve as Chairman of the Industrial Relations Committee. Cooperating with Mr. Lamb, National President, the names of the chairmen of the various committees are to be forwarded to the National Office. These chairmen then become members of their respective National Committees under the same heading, and will be subject to instructions from their National chairmen. In that way the whole organization will function in coordination.

Mr. Paul F. Zerkle had charge of arrangements for a Tango Supper which was held for Cleveland Chapter of A.S.T.E. on May 23rd. The affair was well attended and many new faces, as well as old friends, were seen at the congenial gathering.

The regular May meeting of Cleveland Chapter was held in the General Electric Institute in Nela Park and was given under the auspices of the Carboloy Division of the Company. An excellent dinner was served in the dining room and the technical session was addressed by Mr. A. A. Merry, of the Carboloy Company, who spoke on the design of Carboloy tools and gave other data relative to Carbides. A demonstration on the grinding of cemented Carbide tool bits followed Mr. Merry's talk.

Mr. Fintz then spoke of the contemplated Jig and Fixture Conference at the Ohio State University which is to be a yearly conference sponsored by that University. This matter had previously been considered by Mr. O. B. Jones, a Director of the A.S.T.E. and President of the Detroit College of Applied Science, and Assistant Professor Morrison of Ohio State. Mr. Hawkey was appointed Chairman of a Jigs and Fixtures Committee to contact Cleveland manufacturers so that they might cooperate, if they so desired, toward the success of the venture.

* * *

RACINE

May 22nd was a red letter day for Racine Chapter. A golf tournament for Racine Chapter members, their friends and guests, was held at one of the local country clubs and was well attended by the membership, as well as some out-of-town friends and associates in the industry. After the tournament, a fine banquet was held at which Mr. Ford R. Lamb, President from National Headquarters of A.S.T.E., was present. Mr. Lamb gave an address on the A.S.T.E. organization, some of its goals and ambitions, and told of some of the inter-workings in this young, vital, rapidly growing group.

DETROIT

Detroit Chapter May meeting was the first to be conducted by the new officers. The meeting gave strong indications that this Chapter will forge ahead to greater accomplishments. Although the meeting was not as well attended as had been expected, it was enthusiastic and all concerned expressed great optimism for the future. In addition to several of the National Officers, a number of distinguished guests were present and introduced from the floor. The lessened attendance was due to the intensive engineering program which is in progress in Detroit at present. The meeting was held in the Fort Shelby Hotel as usual.

Of the various committees reporting, Mr. McClellan announced the A.S.T.E. Annual Outing for Detroit and also a golf tournament. Mr. Bayliss, of the Meetings Committee, announced that on June 11th the meeting would be addressed by Mr. H. H. Reinecke in charge of Federal Bureau of Investigation, Detroit. Also that Mr. Cameron, of the Ford Motor Car Company, will be a guest speaker in the fall, that Mr. Charles Martin, of Ex-Cell-O, will discuss *Fundamental Principals of Fixture Design* in October and that Mr. K. T. Keller of the Chrysler Corporation will doubtless take charge of a later meeting. Detroit Chapter, therefore, looks forward to packed houses at the fall sessions.

Mr. Winter, Detroit Chapter Chairman, introduced the speaker of the evening, Mr. R. E. W. Harrison, Vice President of Chambersburg Engineering Company. Mr. Harrison has so many titles, and has held so many important positions in Engineering and Industry, that we do not enumerate them all here; however, he is a member of American, British, German, and French engineering societies, and is also Lt. Commander of the Engineering Division, U.S.N. As a speaker, he met all expectations and certainly merited the standing tribute to his ability as speaker and executive. His speech, abridged, is published elsewhere.

The musical entertainment which so pleased the A.S.T.Eers at the last dinner meeting was furnished by a selected group of students of Northern High School, the Glee Club and Northern High Orchestra. The singers were under the direction of Mrs. Arthur Searle, with Miss Lee, accompanist; the group in its entirety directed by Mr. Orvis Lawrence, Director of Music at Northern High School. The directors are to be commended for the rather remarkable performance of their charges, for the young people showed real talent, both in the orchestral and vocal selections. We express frank appreciation, and the hope that we may hear these entertainers again.

Detroit Student Chapter

A.S.T.E.'s first Student Chapter is well under way with a number of extra—curricular activities. A baseball team has been organized, a dance will be given soon, and other social activities are all under way.

(Continued on page 22.)

ENGINEERED PRODUCTION
EXAMPLES FROM THE SUNDSTRAND FILES
No. 3613
Lathes
Milling Machines
Tool Grinders
Centering Machines
Balancing Tools

Indicating Adaptability And Economy Of Rigidmils

You never know exactly what can be accomplished on a Rigidmil — until you consult the Sundstrand Engineered Production Department. For example, a manufacturer of airplane propellers wanted equipment to replace a large special machine for milling 18″ of contour at the hub end of aluminum alloy propeller blades. He consulted Sundstrand — and purchased the 3-A Rigidmil shown in Fig. 1. Machine is standard throughout, except fixture and spindle arrangement. Upper part of fixture holds a finished blade or "master." Lower part grips the blade to be machined. Both blades rotate at exactly the same rate. Rigidmil column carries an arm on which is mounted a high-speed cutter, with Vee-belt drive. Cutter arm is linked to a similar part overhead which carries a hardened roller that contacts and follows the "master." As blades rotate, and Rigidmil table feeds, the shape of the master is duplicated in the blade being Rigidmiled. Rotation of blades, cutter speed, and table feed all can be varied to suit different requirements. Depth of cut changes, sometimes reaching a maximum of ½″. Actual production is exactly as estimated, will probably increase somewhat as operator gains experience.

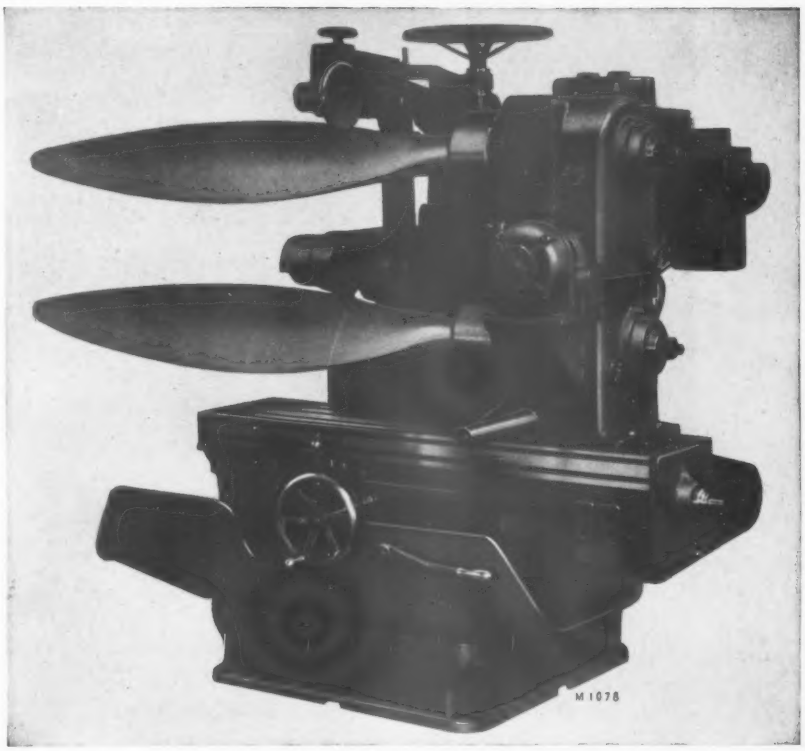


Fig. 1 — 3-A Rigidmil equipped for machining contour on airplane propeller blades.

This unusual job indicates the adaptablility of Rigidmils to a wide variety of work. As to economy — Rigidmil price, operation cost, and overhead are all comparatively low. Any time after its installation, a standard or semi-standard Rigidmil can be used for different work merely by substituting a suitable head and fixture. Here is more adaptability, economy, and protection against obsolescence.

Rigidmils are available in several different standard types which can have vertical or horizontal spindles, reciprocating or rotary tables; low speed, medium speed, or high speed heads. Special heads and fixtures can be applied to any of these machines readily and single-purpose Rigidmils, with hydraulic feed if desired, can be designed and built to order. Investigate Rigidmil cost-cutting, production-increasing possibilities on your work. Write today for complete information.

SUNDSTRAND MACHINE TOOL CO.
2532 Eleventh Street, ROCKFORD, ILLINOIS, U. S. A.

(Continued from page 20.)

In addition to being the first Student Chapter of the organization, this Chapter has the distinction of having the first lady member of A.S.T.E. — Miss Margaret Irene Cecil. The charming young lady, enrolled at the Detroit College of Applied Science, has practically completed courses in mathematics and drafting and has received exceptionally high grades in both. At present she is serving an apprenticeship at the Dodge Brothers Plant in Detroit and says, "All I do is put washers on things, and screw on nuts." Miss Cecil when not kidding her associates, actually is getting practical experience in assembling work at the Dodge Plant while serving her apprenticeship, and plans to become a full-fledged Tool Engineer when she has completed her training and obtained sufficient practical experience.

MARGARET IRENE CECIL
First "Lady A.S.T.Eer"

"GREENFIELD" ACQUIRES DETROIT PLANT

The Greenfield Tap and Die Corporation of Greenfield, Mass., announces the acquisition of the plant, facilities, experience and good-will of the J. M. Carpenter Tap and Die Company of 2102 West Fort Street, Detroit. This plant will be operated as a branch of the Greenfield concern. This old New England company has decided that to give adequate service to the "fastest moving industry in America" a plant at the center of operations will enable it to keep pace with the constantly increasing demands of the motor industry.

The new plant will be under the management of Alfred LaPierre who, for a number of years, has been superintendent of the Gage Department at "Greenfield's" main plant in Greenfield, Mass. He will be assisted by the following: Versil Annis, who will be Office and Merchandise Manager, Glenn Stimson, who will have charge of engineering, and Roy Peterson, Metallurgist, in addition to the Carpenter office and factory employees who will be absorbed by "Greenfield." Al. Kiehne, who worked for "Greenfield" a number of years and who has more recently been employed by the Carpenter Organization, will continue as Chief Inspector.

Penny to Have Charge of Sales

John K. Penny, who has been in charge of "Greenfield" sales in the Detroit area, will be District Sales Manager. "Greenfield's" present Detroit sales force,. which consists of three men, will be augmented by the two former Carpenter salesmen, Messrs. Richmond and Willis.

HANDY ANDY'S WORKSHOP

The workshop is all tooled up and the machinery oiled, all rarin' to go. But, we're held up for material, and right here is where you boys from Cleveland, Milwaukee, Racine and points **N**orth, **E**ast, **W**est, **S**outh, are on the pan. *Send us your stuff! The Tool Engineer* is *your* paper—or ours, to be inclusive—and not an exclusive medium of publicity for Detroit. We want you to help us make it the best journal of its kind in the world. Cooperation and good fellowship will effect that result.

* * *

Send us material, especially good ideas for making better tools. We may not be able to use everything, and material may be edited for better presentation, or to suit requirements, but suitable material is *wanted*. Don't worry about *style*, for our rewrite staff will polish so cleverly that you'll hardly see the changes; however, if you submit drawings make the lines heavy and preferably executed in isometric. That stuff is easy, once you get the trick. Also send us the high lights of your meetings, with personal touches.

* * *

Last but not least, get the material into the hands of the Editorial Committee **on time.** That committee gets the same pay as all the rest of the A.S.T.E. workers. Glory (maybe) if you do your stuff, stuff, and the gong if you don't. Anyway, this is a tough grind, especially when stuff comes in on the 21st that should have been at the printers on the 20th. All material—especially notices of meetings and minutes of preceding meetings—should be at hand at 31 Melbourne St., Detroit, *not later than the 15th.*

* * *

Skoal, Hr. Almquist from Bofors. We hear you are going strong in Sweden, too. Well, here's how—and say, write again, will you?

* * *

Take it from one who knows, those new Hannifin Riveters are the real thing. No noise, but oh, what a wallop!

* * *

That new Universal Precision Thread Grinder of Ex-Cell-O's is a mighty clean piece of design.

Y'ars ago, when ye Columnist knew most of the boys at Brown & Sharpe, the old No. 12 miller was the standby for production. You set it, and she produced, *for those days.* But oh, what that ol' timer has developed into? For while the new No. 12 is a chip off the old block, it just starts in where it's grandad left off. And grandpop was no slouch. Eh, Louis D.?

* * *

Well,Slim McClellan got off to a good start at his debut as Chairman of the Detroit Entertainment Committee. Come again—the sample was *good.*

* * *

Met old friends at the last dinner meeting. Come again—and *again.* And bring *more* friends. At that, it's a great ol' gang.

(Continued on page 30.)

An Important Announcement

For Users of

WIDIA TOOLS

Importation of Widia Cemented Carbide Cutting Tool Material Discontinued

ON MAY 15, 1936 the Fried Krupp Works of Essen, Germany, manufacturers of Widia cemented carbide cutting tool material, ceased importation of this material into the United States.

Thomas Prosser & Son, 15 Gold Street, New York City, United States distributors of this material for the Fried Krupp Works, therefore, on that date discontinued the sale of Widia cemented carbide cutting tool materials.

In order to continue service to users of Widia tools, Carboloy Company, Inc., took over, on May 16, 1936, the Widia cemented carbide tool business of Thomas Prosser & Son, including the entire inventory of Widia material, and the greater part of the Prosser field organization handling Widia tool sales and service.

In connection with this change we wish to announce that we are in a position to handle all former Prosser accounts under the same prices, terms and conditions of sale as existed under Thomas Prosser & Son. We are also able to furnish all current grades of Widia until the former Prosser inventory, which we have acquired, is exhausted. Based on our observation of, and experience with, the performance of Widia grades, it is our sincere belief that, when our inventory of Widia material is exhausted, we will be able to furnish Carboloy grades which will satisfactorily meet all requirements of former Widia tool users. Naturally, we will be pleased to supply Carboloy cemented carbides to former Widia users immediately if desired.

All former Widia users will be given the same attention in the future as in the past, and by the same field men supplemented by our own staff.

CARBOLOY COMPANY, INC.
2985 East Jefferson Ave., Detroit, Mich.

SALES AND SERVICE OFFICES

CHICAGO • CLEVELAND • DETROIT • PITTSBURGH • PHILADELPHIA • NEWARK
PACIFIC COAST REPRESENTATIVES: LOS ANGELES, CALIFORNIA • PORTLAND, OREGON

At the request of Thomas Prosser & Son we wish to state that they have discontinued the sale of Widia material only. Thomas Prosser & Son still continue their business of fine steels, mechanical specialties, chilled iron rolls, hardened steel rolls and machinery of various kinds.

THIS MONTH'S COVER

The unusual and striking photograph reproduced on the front cover of this issue is of more than passing interest. It was awarded the Blue Ribbon Prize at the recent International Exhibit of Professional Photographers sponsored by the Rochester Aethenium Institute, Rochester, New York. Mr. Milton Fields, of the Photographic Section of the General Motors Corporation, was the exhibitor.

The photograph shows the grinding of the outer ends of the rear axle housing tubes of the 1936 Chevrolet truck. This model utilizes the full-floating rear axle. The entire weight of the load is carried on these tubes through roller bearings. The operation photographed is the grinding of the bearing seats on the tube, on which the inner and outer wheel bearings are positioned.

The most completely lost of all days is that on which one has not laughed. —Chamfort

---

"ENGINEER'S DAY" IN CLEVELAND

Plans are rapidly being shaped by a large committee representing the Cleveland Engineering Society, the local sections of the National Societies and other technical and semi-technical organizations for "Engineers Day," which will be held at the Great Lakes Exposition on Saturday, July 11, 1936.

The Great Lakes Exposition marks the 100th anniversary of the incorporation of the City of Cleveland and the affair will be dedicated to the romance of Iron and Steel. The opening date of the Exposition is Saturday, June 27, and will run for one hundred days, or until October 4.

The committee in charge of "Engineers Day" extends a most cordial invitation to the membership of the American Society of Tool Engineers to include Cleveland on their vacation itinerary or business trip around July 11, so as to be here to take part in "ENGINEERS DAY." This will give you an excellent opportunity to meet your fellow engineers from all parts of the country.

Tentative plans are for a luncheon on the Exposition grounds, during which appropriate ceremonies will take place. It is the opinion of the Committee that the remaining portion of the Day should be free for our visitors to enjoy the Romance of Iron and Steel.

PRODUCTION VS PURCHASING

There are two types
Of men
Who prefer
MITCO cutting tools.

The P. A.
Because he knows
He will always get
The right tool
And quality
At reasonable prices—
Plus real service.

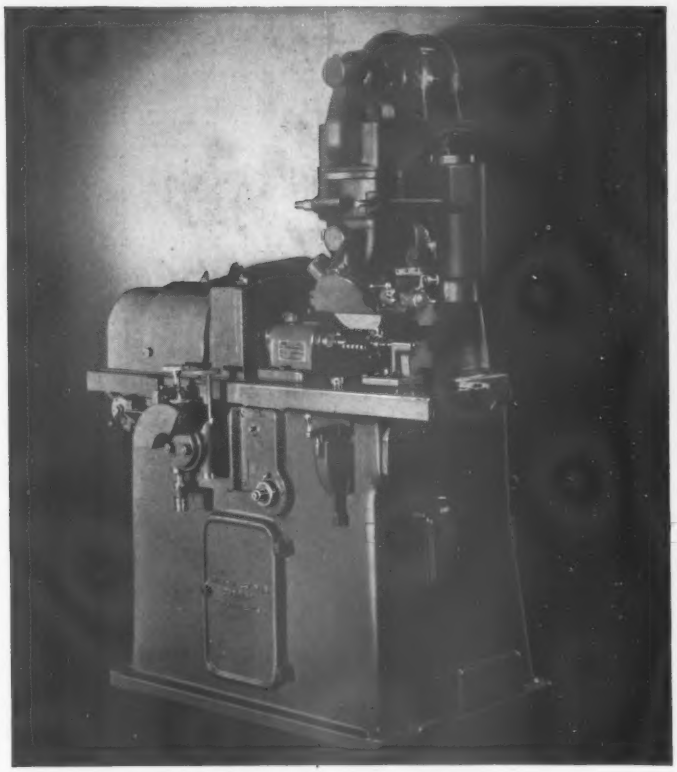
The man
In the shop
Because he knows
The tool will do the job
Right—
And will last longer,
And increase
His own production
Quantity and quality.

Ask them.
And while you are about it
Why not call in a
Michigan Tool Engineer
On that job
That is giving trouble.
There is no charge.

MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit

Telephone
PLaza 9030

There is a Michigan Tool Representative in your territory.



For

ACCURACY and ECONOMY Use the B-C No. 3 Hob Sharpening Machine

When difficulty is encountered on a hobbing operation in regular production it often originates in the hob sharpening. Delays, "grief", and expense in this connection can be eliminated by using the Barber-Colman No. 3 Automatic Hob Sharpening Machine shown above. This machine does a far better, more accurate, more uniform and faster job than any hand-operated grinder can be expected to do. Set-up is simple, indexing accurate, feed-rate and depth of grind positively controlled. A few simple adjustments prepare the machine for sharpening straight- or helical-gashed hobs, or formed cutters, with radial tooth-faces or rake. Uniformly accurate sharpening then proceeds automatically so that one operator can run other machines also if desired.

On straight run work sharp hobs maintain high production, high quality and accuracy of surfaces hobbed, reduce operating costs, increase profits. To secure these advantages, hobs must be sharpened *correctly* and *kept* that way. Sharpening hobs of any make is easy on the Barber-Colman No. 3 Automatic Hob Sharpening Machine. Profitable, too. Manufacturers using hobbing machines are invited to investigate Barber-Colman Hob Sharpening and to write for descriptive literature.

Barber-Colman Hobbing Service is complete. In addition to the Hob Sharpening Machine it includes Hobbing Machines in a variety of sizes and types; Hobs, standard or special, with ground or unground tooth forms; Engineering and Inspection Services. Write. today, for details.

BARBER B-C COLMAN

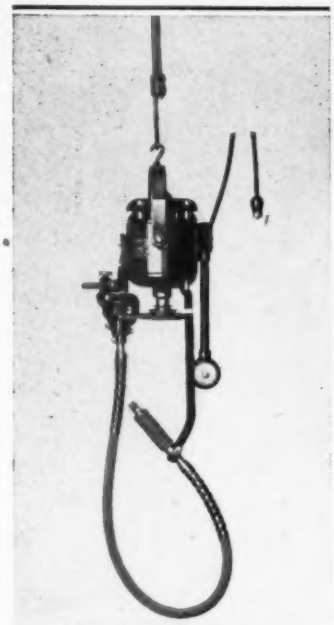
PRODUCTS
MILLING CUTTERS, HOBS, HOBBING MACHINES, HOB SHARPENING MACHINES, REAMERS, REAMER SHARPENING MACHINES, SPECIAL TOOLS

BARBER-COLMAN COMPANY
Rockford, Illinois, U. S. A.

Represented in the Detroit Territory by
HODGES MACHINERY CO.
544 New Center Building

QUALITY **Strand** SERVICE

FLEXIBLE SHAFT MACHINES
for the



TOOL AND DIE MAKERS

This illustration shows our vertical machines with three speeds in capacities of 1/6—1/4—1/3 H.P. Speed Combinations of 1700 3000 5200 or 3400—6000 10,400

We build over sixty types and sizes 1/8 to 2 H.P. Vertical and horizontal types.

SEND FOR OUR COMPLETE CATALOG.

N. A. STRAND & CO.
5001 N. Lincoln St. Chicago, Ill.

DETROIT CHAPTER

An opportunity to show the world whether you play as good a game of Golf as you say you do will be given each member of the A.S.T.E.

THE PLACE: Rammler Golf Club
THE DATE: July 25, 1936
THE TIME: 10:30 A.M.
THE PRICE: $1.50

This price includes lunch for each individual which will be served in a room set aside for the day for our private use.

Eighteen holes of Golf are also included in the price of the ticket.

Polish up your clubs and let us know how many will be in your party on the date specified.

(Continued from page 14.)

One end of the pivoted lever extends back into the body of the gage to make a contact with the point of the indicator.

In the operation of the gage the part is held against the three buttons and the two points of the lever by gravity, if the part is revolved any angularity of the bore causes the lever to teeter, actuating the indicator.

This gage is very accurate, in fact in making a perfectly square master ring, it was necessary to use the gage to check the master.

WE ASK YOU ---

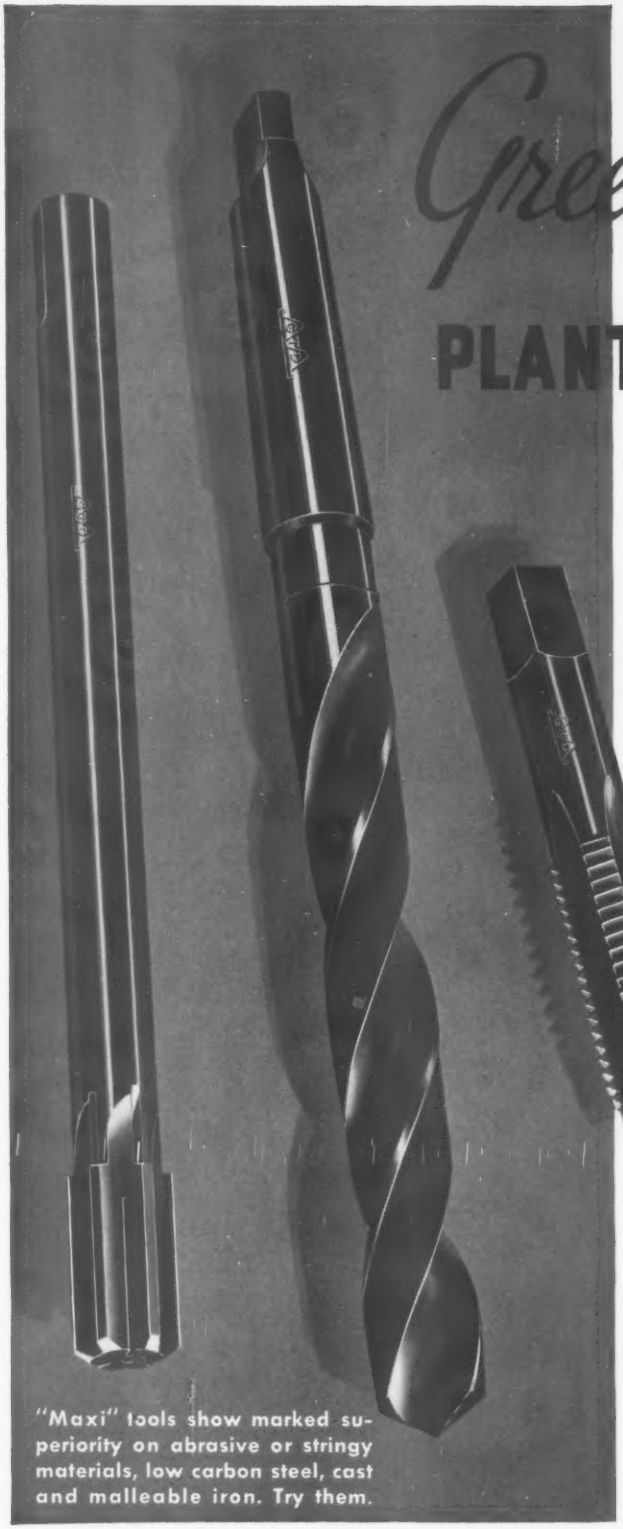
Are your roughing inserted tooth face mills designed for maximum blade life?

They would be if you were using the ▽ & ▽ inserted cone type design.

The adjustment is positive and uniform, making it unnecessary to scale each blade as it is set out, as well a being in the direction to compensate for major blade wear.

THINK IT OVER

GODDARD & GODDARD CO.
DETROIT



"Maxi" tools show marked superiority on abrasive or stringy materials, low carbon steel, cast and malleable iron. Try them.

Greenfield OPENS PLANT IN *Detroit*

Purchases J. M. Carpenter Tap and Die Company to service manufacturers in Middle West

"*Greenfield*" announces the acquisition of a complete, modern plant in Detroit which has been fully equipped and staffed with trained tool designers and engineers to give Middle Western manufacturers the most rapid service ever available on "special" taps of all kinds.

Full stocks of all standard "*Greenfield*" tools will also be carried at this Detroit plant to fill emergency orders, so whatever your needs, they can be satisfied completely, and *quickly*.

You may count on highest quality tools; a skilled advisory and engineering service, and speedy delivery when you send your orders for "special" taps to the new Detroit plant.

THE DETROIT ADDRESS
2102 West Fort Street
Telephone LAfayette 0411

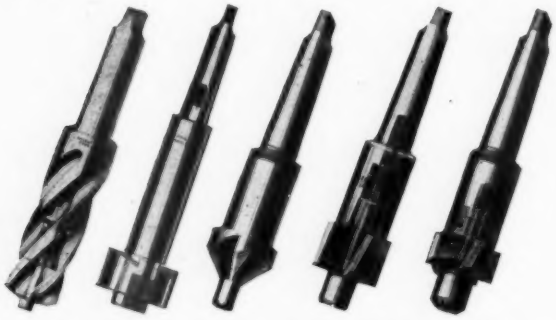
GREENFIELD TAP & DIE CORPORATION
Greenfield, Mass.
New York Chicago Detroit

Maxi they're Black *Tools*

GREENFIELD

Standard Gairing Cutting .Tools and Tool Holders.

All Gairing Tools are of the highest standard and quality that engineering research, mechanical skill, proper heat treatment, proper materials and modern equipment can produce. In addition to standard cutting tools and holders, many distinctive and indivdual special tools for intricate operations are manufactured. Standard tools are carried in stock, ready for immediate shipment.



The design of these tools and mechanical principles are based on practical experience and knowledge of the varied conditions under which counterboring is done. We can meet all your regular and special needs for counterboring and spotfacing tools.

Ask for Catalog No. 30

THE GAIRING TOOL CO.

DETROIT, MICHIGAN

Detroit Chapter's Annual Outing, June 21

Yessir, it's the Annual A.S.T.E. Outing, same place as last year, at Maple Grove Park—only bigger, better and merrier than ever. And it's for the whole family, with plenty of fun planned for all. Games and races for young and old, fat and lean, with a ball game between the Senior and Junior Societies. Eats are a la Basket, so get on the good side of friend wife and have her pack the real McCoy in a picnic lunch.

The date is June 21st.; the day Sunday. Mark it in red on your calendar, for it's going to be a gala day. June 21st.

Maple Grove Park is on Utica Road, just north of Schoenherr Road. A sign at the intersection will direct you to the grounds. You will hear more about it. This is just a preliminary reminder *to mark the date.* Let's go!

UNIVERSAL COLLET CHUCK

GRIPS AS STRONG AS SOLID STEEL

CONCENTRIC WITHIN .001

FOR END MILLS

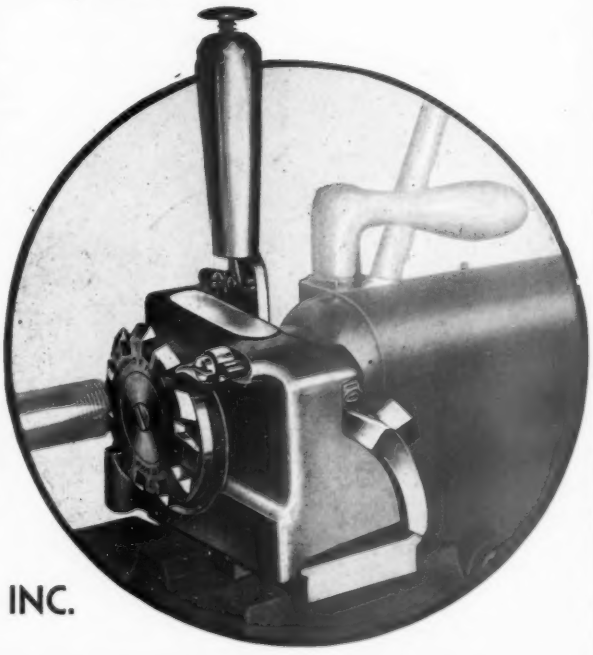
UNIVERSAL ENGINEERING CO. FRANKENMUTH, MICH.

RIVETT IMPROVED THREAD TOOL

Mounts on any screw cutting engine lathe. An unskilled operator can use it. For any diameter or form (except square) of six pitch or finer. THE THREAD TOOL is a holder for a ten tooth cutter with means for indexing the cutter to present each of the ten teeth successively to the work, and with adjustments for controlling the size of the finished thread.

THE CUTTER is a disc of the best tool steel with ten teeth, each tooth having a prescribed increase in radial length over the preceding tooth, thus comprising, in effect, ten cutting tools. The first nine teeth rough out the thread progressively in nine heavy measured cuts, and the tenth tooth finishes the thread. The responsibility of the operator is reduced to indexing the cutter when reversing the lathe. The thread tool does the rest.

Bulletin 110-A



RIVETT LATHE & GRINDER, INC.

BRIGHTON, BOSTON, MASS.

Ingersoll Cutter Grinder

Single Setting of Cutter
FOR ALL OPERATIONS

Single Setting of Finger
FOR ALL OPERATIONS

Quickly grinds at a single setting cutters from 5″ to 30″ in diameter with face up to 7″ wide. An 8″ cutter showing average wear accurately reground in 6 minutes, floor to floor.

Grinds face mills, end mills, angular cutters, radius cutters, concave or convex side milling cutters, half side mills, staggered tooth cutters.

Send for Ingersoll Cutter Grinder Catalog

THE INGERSOLL MILLING MACHINE CO., ROCKFORD, ILLINOIS, U. S. A.

You know, there's something darned likeable about an Englishman, as a rule, and Mr. Harrison, who told us all about drop forging, went over big. His audience was treated to an instructive and interesting talk, rendered in English so precise, so clearly enunciated, and so softened with rounded vowels that listening was a pleasure—and a lesson in English as it *should* be spoken. We liked your talk, Mr. Harrison.

* * *

Prexy Lamb is just getting behind the A.S.T.E. wagon and making it *move*. Let's all lend a hand.

* * *

And while we're at it, let's give the Student Chapter a big boost. They're comers, those boys.

* * *

S'all. See you next month. H.A.

Rollway

ROLLS!

The motion in this non-clogging coolant and lubricant pump is always *rolling*. No scraping of working parts against pump chamber. Wear reduced to a minimum.

ENGINEERING DATA SHEET

Ask for Data Sheet for your files, describing reversing and non-reversing models, with or without automatic built-in relief valve.

PIONEER ENGINEERING AND MFG. CO.

35 Melbourne, Detroit, Mich.

Also Centrifugal and Hydraulic Pumps.

Letter From a Member

Bofors, April 7, 1936

The Tool Engineer
Detroit, Michigan, U.S.A.

Dear Sir:

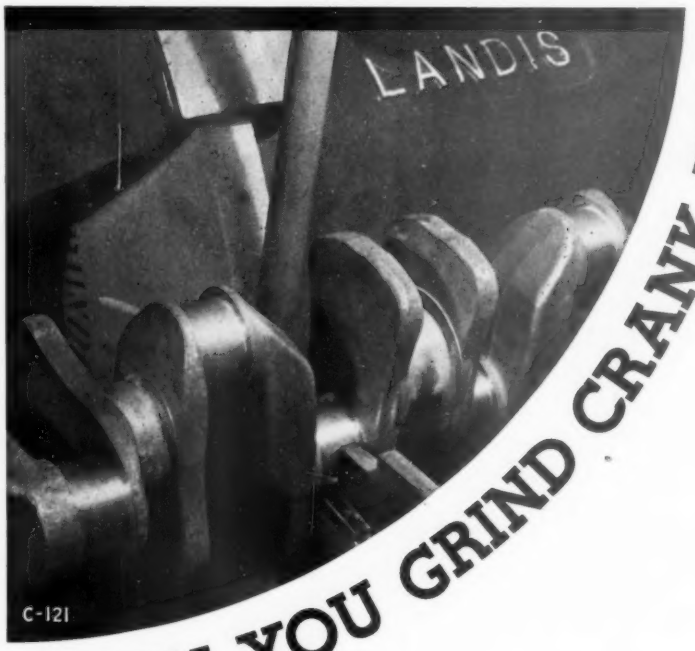
Notifying you of my change of address I take the opportunity to thank you for your letter of a year ago. As I had nothing of interest to write about, you received no reply at the time.

I work as a planning engineer at The A. B. Bofors, manufacturer of arms, especially guns. Mr. Gordon has written an article about this factory in *The A.S.T.E. Journal* of some years ago. I wish to tell you that I enjoy *The Tool Engineer* very much. It reminds me of big doings, great cities and my years in U.S.A. I am also very interested in the standards on tools and machinery. In fact I think it is a great work the A.S.T.E. has started in turning them out.

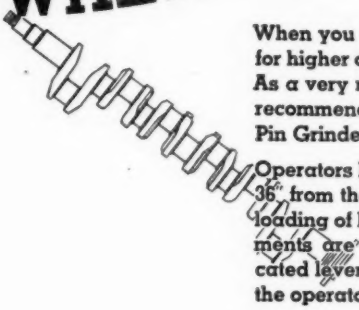
Very truly yours,
(Signed) Gustav B. Almkvist
Address: Stromsbro
Bofors, Sweden

The Machinery & Tool Sales, Inc., has recently been organized with J. R. Stone as President, and L. J. Jurzek as Secretary-Treasurer, both identified in the automotive machinery and production field for many years, with offices at 401 New Center Building, Detroit.

Reed - Prentice Corporation of Worcester, Mass., has arranged to manufacture the De-Vlieg Milling Machines, and STERLING - FRENCH MACHINERY CO., 423 New Center Bldg., Detroit, will handle the sales for Detroit territory.



WHEN YOU GRIND CRANK PINS



When you grind crank pins you are always striving for higher output, greater accuracy and better finish. As a very real aid in the securing of these ends we recommend the Landis 16″ Type D Hydraulic Crank Pin Grinder.

Operators like this machine. A work center line only 36″ from the floor makes easier the loading and unloading of heavy crankshafts. Seven machine movements are controlled by a single conveniently located lever. Safety features thoroughly protect both the operator and the machine.

These are only a few of the reasons why the Landis 16″ Type D contributes so largely to economical manufacture and improved product. You should see one in operation to fully appreciate its possibilities. 195

LANDIS TOOL CO.
WAYNESBORO, PA.

Publications and New Literature Available

Peter A. Frasse & Co. Inc. steel distributors in the East have published a new 42-page booklet on Fabrication and Treatment of USS Stainless and Heat Resisting Steels. A major service of the company is outlined; the technical staff, which serves as a clearing house of information on new products, new applications and methods of fabrication and treatment in all types of steel. The booklet was prepared by Mr. D. C. Buck, of the Stainless Steel staff. Those interested may obtain a copy of this up-to-date booklet by writing Peter A. Frasse & Co., Inc., at their New York office and warehouse, 17 Grand Street, New York City.

Gorham Tool Company, of 14400 Woodrow Wilson Avenue, **Detroit,** has issued a new ring binder catalogue on cutters and small tools of special interest to the Tool Engineer, since it contains several interesting departures from the conventional.

The **Ingersoll Milling Machine Co.,** of **Rockford** has issued a circular describing the New Ingersoll Tri-Lock triple serrated cutter for milling narrow keyways and for slotting. Prices and full specifications are given in the circular describing this cutter, which was also described in a recent issue of *The Tool Engineer.*

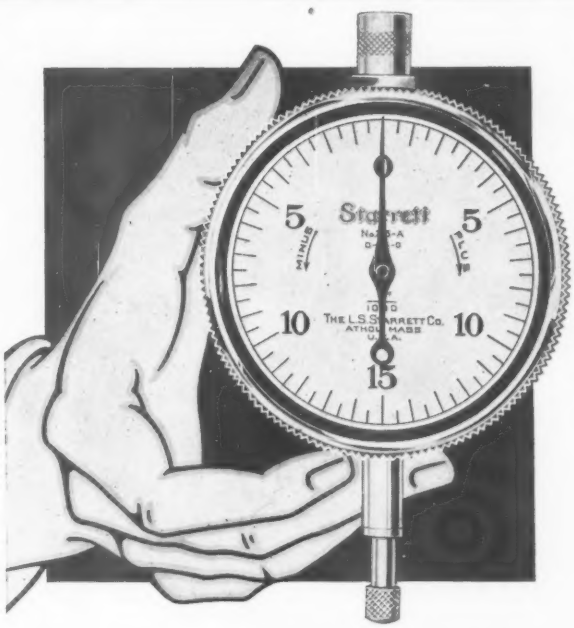
Pratt & Whitney Company, Hartford, Conn., has just issued their circular No. 421 which illustrates and describes all milling cutters and tracers. The circular illustrates the very latest practices, gives a complete listing of all cutters and tracer points and is strictly up-to-date.

Lincoln Electric Company, Cleveland, Ohio, states that practically 20,000 copies of the "Procedure Handbook of Arc Welding Design and Practice" have already been sold. This, the third edition, issued in September, 1935, and containing nearly 600 pages and more than 700 illustrations on every important phase and application of arc welding, is reported going rapidly. The Handbook has been sold in every State of the Union as well as in almost every foreign country, and is widely used in technical schools either as a text or reading course.

(Continued from page 12.)

From **Washington, D. C.** we hear that farm equipment and allied products totaled $351,998,066 in 1935 as compared to $214,390,792 for 1931. **Estimates, now, indicate that 1936 figures will show a considerable gain over 1935. International Harvester** truck manufacturing plants at Fort Wayne, Indiana and at Springfield, Ohio are **both working three shifts producing both heavy duty and light trucks.** A company official indicated that there was no apparent let-up in sight. **All tractor plants**—notably in Racine, Cleveland, and Peoria **are very busy.**

From Kansas City, Mo., we hear the **Vogle Tool Company** has purchased new tool equipment. **Business has doubled** in the past year for this company which ships tools of its own manufacture all over the United States. **H. A. Walton,** manager of the **Paddock Tool Company,** Kansas City, Mo., states his plant is running at full capacity with sizable orders coming in every day. The company manufactures bandsaw guides exclusively which are used for cutting wood, metal, bone, rubber, cork, dry ice, and many other purposes.



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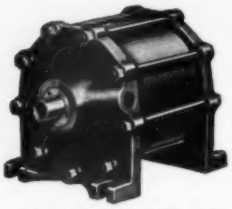

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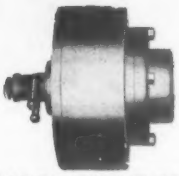

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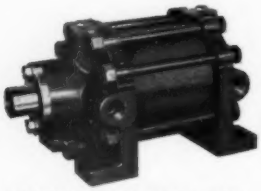

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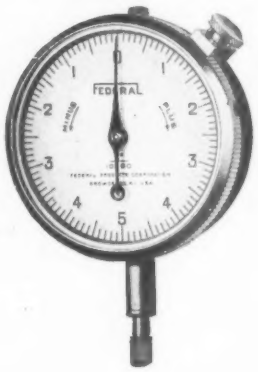

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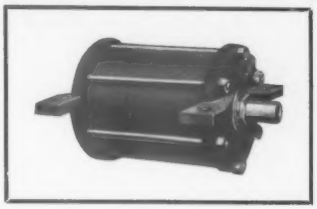

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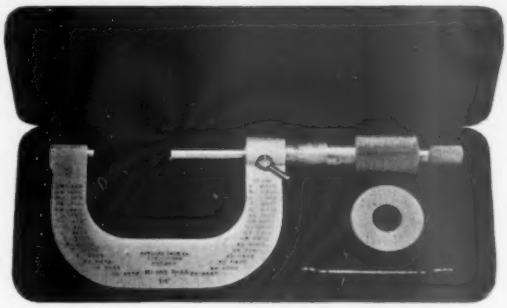

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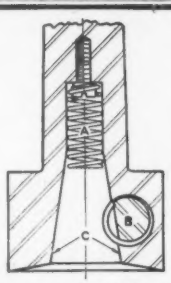

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